Search History

STN (HCAPLUS, USPATFULL, JAPIO, INSPEC) 6/6/07

=> d l13 1-3 abs,bib

L13 ANSWER 1 OF 3 USPATFULL on STN

AB A crystal puller for growing monocrystalline ingots includes a side heater adjacent a crucible for heating the crucible and a melt heat exchanger sized and shaped for surrounding the ingot and disposed adjacent a surface of the melt. The heat exchanger includes a heat source having an area for radiating heat to the melt for controlling heat transfer at the upper surface of the melt. The melt heat exchanger is adapted to reduce heat loss at the exposed upper surface portion. Methods for growing single crystal silicon crystals having desired defect characteristics are disclosed.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AN 2004:148071 USPATFULL

TI Crystal puller and method for growing a monocrystalline ingot

IN Kulkarni, Milind, St. Louis, MO, UNITED STATES

PA MEMC Electronic Materials, Inc. (U.S. corporation)

PI US 2004112277 A1 20040617

AI US 2003-705813 A1 20031110 (10)

PRAI US 2002-425556P 20021112 (60)

DT Utility

FS APPLICATION

LREP SENNIGER POWERS LEAVITT AND ROEDEL, ONE METROPOLITAN SQUARE, 16TH FLOOR, ST LOUIS, MO, 63102

CLMN Number of Claims: 46

ECL Exemplary Claim: 1

DRWN 76 Drawing Page(s)

LN.CNT 2156

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L13 ANSWER 2 OF 3 USPATFULL on STN

AB A method and system for controlling growth of a taper portion of a semiconductor **single crystal** based on the slope of the taper. A **crystal** drive unit **pulls** the growing crystal from a melt at a target pull rate that substantially follows an initial velocity profile for growing the taper. A controller calculates a taper slope measurement as a function of a change in crystal diameter relative to a change in crystal length. The controller then generates an error signal as a function of the difference between the taper slope measurement and a target taper slope and provides a pull rate correction to the crystal drive unit as a function of the error signal. In turn, the crystal drive unit adjusts the pull rate according to the pull rate correction to reduce the difference between the taper slope measurement and the target taper slope. The target taper slope is defined by a function having a generally exponential component and a generally linear component.

AN 2001:82145 USPATFULL

TI Method and system of controlling taper growth in a semiconductor crystal growth process

IN Kimbel, Steven L., St. Charles, MO, United States
Wyand, III, Robert R., St. Charles, MO, United States

PA MEMC Electronic Materials, Inc., St. Peters, MO, United States (U.S. corporation)

PI US 6241818 B1 20010605

AI US 1999-287916 19990407 (9)

DT Utility

FS Granted

EXNAM Primary Examiner: Kunemund, Robert

LREP Senniger, Powers, Leavitt & Roedel

CLMN Number of Claims: 18

ECL Exemplary Claim: 1

DRWN 5 Drawing Figure(s); 5 Drawing Page(s)

LN.CNT 651

L13 ANSWER 3 OF 3 USPATFULL on STN

AB An automated crystal pulling system utilizes a digital computer to control a Czochralski crystal puller. Crystal pull rate, crystal spin rate, crucible lift rate and crucible spin rate are monitored with tachometers, and the monitored signals are applied to **controllers** to **control** the respective motors and provide **independent** closed **control** loops, with each **controller** having a set point signal input from the computer. A sensor detects the output level of the radio frequency generator (induction heater) and applies a signal to a generator controller having a set point input from the computer, providing closed loop temperature **control**. A **temperature control** algorithm receives an input from a **melt temperature** sensor and calculates the set point to the generator controller. A diameter control algorithm receives an input from a crystal diameter sensor and calculates the set point to the crystal pull motor controller. A melt level control algorithm claculates the set point to the crucible lift motor **controller** to provide a constant **melt** level. An adaptive **control** algorithm **adjusts melt temperature**, via the **temperature control** algorithm, as required to maintain average pull rate within imposed limits. Crystal specifications are input to the computer via a card reader. Operators are required only to load the charge, read in the specification card, grow the crystal stem, initialize various procedures, and remove the crystal ingot and clean and reload the puller.

AN 73:44110 USPATFULL
TI AUTOMATED CRYSTAL PULLING SYSTEM
IN Cope, Edward G., Dallas, TX, United States
PA Texas Instruments Incorporated, Dallas, TX, United States (U.S. corporation)
PI US 3761692 19730925
AI US 1971-185790 19711001 (5)
DT Utility
FS Granted
EXNAM Primary Examiner: Ruggiero, Joseph F.
LREP Harold Levine et al.
CLMN Number of Claims: 2
DRWN 49 Drawing Figure(s); 24 Drawing Page(s)
LN.CNT 1329

=> d his

(FILE 'HOME' ENTERED AT 17:02:36 ON 06 JUN 2005)

FILE 'HCAPLUS, INSPEC, JAPIO, ABI-INFORM' ENTERED AT 17:02:50 ON 06 JUN 2005

FILE 'HCAPLUS, INSPEC, JAPIO, USPATFULL, USPAT2' ENTERED AT 17:03:01 ON 06 JUN 2005

L1 5814 S (CONTROL? OR ALTER? OR VARY? OR ADJUST?)(8A)(TEMPERATURE#(8A)
L2 1969 S (CORRELAT? OR COMPAR? OR ADJUST?)(8A)(TEMPERATURE#(6A)MELT#)
L3 108041 S (PULS?(8A)GENERATOR#)
L4 4037 S (INCREAS?)(8A)(MELT#(6A)TEMPERATURE#)
L5 1578 S (DECREAS?)(8A)(MELT#(6A)TEMPERATURE#)
L6 1085 S L1 AND L2
L7 9 S L1 AND L2 AND L3
L8 82 S L1 AND L2 AND L4 AND L5
L9 1 S L7 AND L8
L10 6827 S (CRYSTAL?(6A)PULL?)(10A)(MONO(4A)CRYSTAL# OR SINGLE(4A)CRYSTA
L11 211984 S (INDEPENDENT?)(8A)(VARY? OR CONTROL? OR ALTER? OR ADJUST?)
L12 876 S (MELT#(6A)TEMPERATURE#)(8A)(HEATER#)
L13 3 S L1 AND L2 AND L4 AND L5 AND L10 AND L11 AND L12

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L12 ANSWER 5 OF 5 USPATFULL on STN
AB In a single crystal growing technique (crystal pulling) a method and apparatus for minimizing impurity contamination and preventing heat convection currents from affecting the solid-melt crystal growing interface which uses a floating baffle plate in the interior of the feed melt containing crucible in order to obtain a single crystal of a compound semiconductor having a high melting point and exhibiting a high dissociation pressure at the said melting point such as a compound semiconductor of Groups III-V, especially GaAs or Gap, the crystal having a small dislocation density. Improvement is made on the shape of the baffle plate and on baffle plate control means, and this baffle plate is combined with selected intra-furnace pressure or heating means or temperature measuring means.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AN 89:40971 USPATFULL
TI Single crystal growing method and apparatus
IN Nishizawa, Minoru, Tokyo, Japan
PA Gakei Electric Works Co., Ltd., Tokyo, Japan (non-U.S. corporation)
PI US 4832922 19890523
AI US 1987-102373 19870929 (7)
RLI Division of Ser. No. US 1984-675409, filed on 27 Nov 1984
PRAI JP 1984-182435 19840831
JP 1984-182436 19840831
JP 1984-182437 19840831
DT Utility
FS Granted
EXNAM Primary Examiner: Doll, John; Assistant Examiner: Breneman, R. Bruce
LREP Fleit, Jacobson, Cohn & Price
CLMN Number of Claims: 14
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 6 Drawing Page(s)
LN.CNT 593
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

=> d his

(FILE 'HOME' ENTERED AT 16:32:32 ON 06 JUN 2005)

FILE 'USPATFULL, USPAT2' ENTERED AT 16:32:55 ON 06 JUN 2005
L1 3954 S (CONTROL? OR ADJUST? OR ALTER? OR VARY?)(8A)(TEMPERATURE(6A)M
L2 69480 S (PULSE)(8A)(GENERATOR#)
L3 6692 S (MELT#(8A)LEVEL#)
L4 4766 S (BOTTOM(4A)HEATER#)
L5 183975 S (HEATER#)
L6 1559 S (INDEPENDENT?(8A)CONTROL?)(8A)(HEATER#)
L7 0 S L1 AND L2 AND L3 AND L6
L8 59 S L1 AND L6
L9 0 S L1 AND L2 AND L6
L10 30 S L1 AND L3 AND L6
L11 8178 S (CRYSTAL(6A)DIAMETER#)
L12 5 S L10 AND L11

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STN (USPATFULL) 6/6/07

=> d l12 1-5 abs,bib

L12 ANSWER 1 OF 5 USPATFULL on STN

AB An electrical resistance heater for use in a crystal puller used for growing monocrystalline silicon ingots according to the Czochralski method comprises a heating element sized and shaped for disposition in the housing of the crystal puller around the crucible for applying heat to the crucible and silicon therein. The heating element includes heating segments connected together in an electric circuit. The segments have upper and lower sections and are arranged relative to each other so that when disposed around the crucible containing molten silicon the upper sections are disposed generally above a horizontal plane including the surface of the molten silicon and the lower sections are disposed generally below the horizontal plane. The upper sections are constructed to generate more heating power than the lower sections thereby to reduce a temperature gradient between the molten silicon at its surface and the ingot just above the surface of the molten silicon. The upper sections have a thickness substantially equal to the thickness of the lower sections and have a width substantially less than the width of the lower sections. The cross-sectional area of the upper sections is everywhere less than the cross-sectional area of the lower sections.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AN 2000:95212 USPATFULL

TI Electrical heater for crystal growth apparatus with upper sections producing increased heating power compared to lower sections

IN Schrenker, Richard G., Chesterfield, MO, United States
Luter, William L., St. Charles, MO, United States

PA MEMC Electronic Materials, Inc, St. Peters, MO, United States (U.S. corporation)

PI US 6093913 20000725

AI US 1998-92391 19980605 (9)

DT Utility

FS Granted

EXNAM Primary Examiner: Jeffery, John A.

LREP Senniger, Powers, Leavitt & Roedel

CLMN Number of Claims: 11

ECL Exemplary Claim: 1

DRWN 4 Drawing Figure(s); 2 Drawing Page(s)

LN.CNT 586

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L12 ANSWER 2 OF 5 USPATFULL on STN

AB An apparatus and method employing an interface heater segment for control of a shape of a peripheral edge region of a solidification interface in a Czochralski crystal pulling process are provided wherein an interface **heater** segment, **independently controllable** from a primary **heater**, is provided at the level of the solidification interface around the periphery of the crucible, the interface heater segment being selectively controlled to influence the shape of the solidification interface at the peripheral edge region thereof, in order to eliminate problems experienced with edge downturn at the peripheral edge region of the interface.

AN 92:65779 USPATFULL

TI Apparatus and method employing interface heater segment for control of solidification interface shape in a crystal growth process

IN Azad, Farzin H., Clifton Park, NY, United States

PA General Electric Company, Schenectady, NY, United States (U.S. corporation)

PI US 5137699 19920811

AI US 1990-628036 19901217 (7)

DT Utility

FS Granted

EXNAM Primary Examiner: Kunemund, Robert; Assistant Examiner: Garrett, Felisa

LREP Glaubensklee, Marilyn, Davis, Jr., James C., Webb, II, Paul R.

CLMN Number of Claims: 16

ECL Exemplary Claim: 1

DRWN 2 Drawing Figure(s); 2 Drawing Page(s)
LN.CNT 526

L12 ANSWER 3 OF 5 USPATFULL on STN
AB An apparatus and method employing a radiative heater for control of a shape of a peripheral edge region of a solidification interface in a Czochralski crystal pulling process are provided wherein a radiative **heater** element, **independently controllable** from a primary **heater**, is provided above the upper **level** of the **melt** and of the solidification interface around the periphery of the crystal, the radiative heater element being selectively controlled to influence the shape of the solidification interface at the peripheral edge region thereof, in order to eliminate problems experienced with edge downturn at the peripheral edge region of the interface.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AN 92:59664 USPATFULL
TI Apparatus and method employing focussed radiative heater for control of solidification interface shape in a crystal growth process
IN Azad, Farzin H., Clifton Park, NY, United States
PA General Electric Company, Schenectady, NY, United States (U.S. corporation)
PI US 5132091 19920721
AI US 1990-628025 19901217 (7)
DT Utility
FS Granted
EXNAM Primary Examiner: Kunemund, Robert; Assistant Examiner: Garrett, Felisa
LREP Glaubensklee, Marilyn, Davis, Jr., James C., Webb, II, Paul R.
CLMN Number of Claims: 16
ECL Exemplary Claim: 1
DRWN 2 Drawing Figure(s); 2 Drawing Page(s)
LN.CNT 580
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L12 ANSWER 4 OF 5 USPATFULL on STN
AB In a single crystal growing technique (crystal pulling) a method for minimizing impurity contamination and preventing heat convection currents from affecting the solid-melt crystal growing interface which uses a floating baffle plate in the interior of the feed melt containing crucible in order to obtain a single crystal of a compound semiconductor having a high melting point and exhibiting a high dissociation pressure at said melting point such as a compound semiconductor of Groups III-V, especially GaAs or Gap, the crystal having a small dislocation density. Improvement is made on the shape of the baffle plate and on baffle plate control mechanisms, and this baffle plate is combined with selected intra-furnace pressure or heating mechanisms or temperature measuring mechanisms.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AN 89:85610 USPATFULL
TI Single crystal growing method having improved melt control
IN Nishizawa, Minoru, Tokyo, Japan
PA Gakei Electric Works Co., Ltd., Tokyo, Japan (non-U.S. corporation)
PI US 4874458 19891017
AI US 1984-675409 19841127 (6)
PRAI JP 1984-182435 19840831
JP 1984-182436 19840831
JP 1984-182437 19840831
DT Utility
FS Granted
EXNAM Primary Examiner: Lacey, David L.
LREP Fleit, Jacobson, Cohn, Price, Holman & Stern
CLMN Number of Claims: 5
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 6 Drawing Page(s)
LN.CNT 517
CAS INDEXING IS AVAILABLE FOR THIS PATENT.